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S. OZAKI

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SAYS ALCOHOL FUEL FOR FUTURE OWNERS; SUBSTITUTE FOR GAS

With approximately 3,000,000 motor vehicles doing duty in the United States, from 1,000,000,000 to 1,200,000,000 gallons of gasoline have to be provided annually to keep them running. There are unmistakable signs that the production of this enormous volume of gasoline will become increasingly difficult and as a consequence there is in the minds of many automobile engine students the vague thought that gasoline, while the fuel of today, may have to give way to some other product tomorrow. In this connection it is comforting to know that there is a substance already well known which can take the place of gasoline and run these automobiles just as efficiently, and perhaps more so, according to Bernard N. Glick, M. Sc., who is making a study of motor car fuels for The Automobile.

The substance that thus stands out prominently as the fuel of the future is alcohol. This product has long since passed the stage where its suitability was questionable, the only thing retarding its adoption being its high price, due to the raw materials now used and the limited use to which it is put at present. With a growing demand, such as will arise when the price of gasoline becomes abnormally high, we anticipate a search for cheaper methods of production and for raw materials which will give it in sufficient amounts to meet the enormous demand that will exist for a suitable fuel for internal combustion engines.

The question of the suitability of alcohol as a source of power in internal combustion engines has been sufficiently established by long series of tests conducted by various groups of experimenters. The United States bureau of mines has done magnificent work in this direction and many of the following figures comparing gasoline and denatured alcohol are taken from the results of their painstaking efforts to help solve the fuel problem of the future. Although the calorific power of alcohol is little more than one-half that of gasoline, its great efficiency—alcohol 28 per cent; gasoline 16 per cent—compensates for this. The higher efficiency of alcohol is due to various causes, chief among which are the following:

1. The volume of air required for complete combustion of alcohol is only about one-third that required by gasoline, and thus much less energy goes away in the exhaust. Moreover, this smaller dilution with air enables a more perfect mixture to be formed, with consequent more perfect combustion.
2. The alcohol-air mixture can be safely subjected to pressures of 200 pounds a square inch without spontaneous ignition, whereas the safety limit for gasoline is 80.
3. All mixtures of alcohol and air containing from 4 to 13.6 per cent of alcohol are explosive, whereas the explosive range for gasoline is from 2 to 5 per cent, necessitating much more careful carburetor adjustment.
4. The combustion products of alcohol are smokeless, almost odorless

and do not clog up the cylinders and valves.

The only serious difficulty encountered would be the starting of the engine in cold weather, and this could be provided for by carrying a small auxiliary gasoline tank to be used in starting.

Raw Materials Abundant

The possible raw materials for alcohol production are unlimited, for anything containing starch, cellulose or sugar can be utilized. In the case of starch we are limited at present to established crops, and the cost of the raw material from such substances as potatoes, maize and rice includes raising the crop, harvesting it, transportation to the distillery and the final conversion there to alcohol. As a consequence the cost of the raw material is too great, varying as it does from 12 to 25 cents a gallon of finished alcohol.

Lumber Waste Available

Of all the above possible sources, the most interesting, owing to the low cost of raw material, is the waste from the lumber industry, particularly that in the form of sawdust or small chips. This material in the vicinity of sawmills or woodworking plants is often an item of loss owing to its production in excess of their own power requirements, its value never rising above 50 cents a ton, even when used as a source of power. The disposal of this superfluous waste from figures gathered by the Forest Products Laboratory at Madison, Wis., costs from 30 to 66 cents a cord of 1800 pounds, the total annual loss from this cause amounting to about \$6,000,000 annually, in addition to the value of the wood so burned.

This represents an annual wastage of approximately 15,000,000 cords of

wood and constitutes only about 50 to 60 per cent of the total waste material produced in this form. Thus we see that there is produced annually in the United States waste material amounting in volume to about 30,000,000 cords, or around 27,000,000 tons, which is now burned as the easiest method of getting rid of it.

Wood Alcohol Useless as Fuel

From experiments which have been carefully conducted by various experimenters a ton of dry sawdust has been found to yield with proper treatment around 20 to 25 gallons of 95 per cent alcohol (ethyl or grain alco-

hol, not wood alcohol, for this latter is useless for fuel purposes owing to the formation of products of combustion which would wreck the cylinders) and we could have therefore an estimated production from this source alone of around 500,000,000 gallons annually.

If we add to this the amount of wood wasted in the form of stumps and branches sufficiently thick to be barked, which on a conservative basis is equal in amount to the sawdust and chips produced, we would get from this "waste" wood a volume of alcohol almost sufficient to supply

with fuel even the stupendous number of automobiles at present in use.

PROTECT MAGNETO

Extreme care should be taken when washing the bonnet over motor with a hose to keep water from spraying on the magneto.

HE KNEW

School teacher (to little boy): If a farmer raised 1700 bushels of wheat and sold it for \$1.17 per bushel, what will he get?
Little Boy—Automobile.

Gas Engines For All Purposes

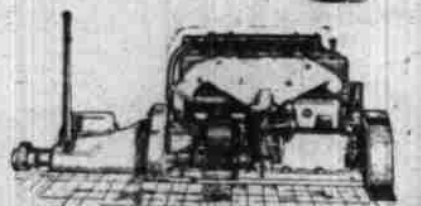
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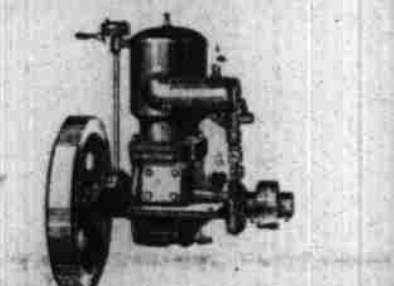
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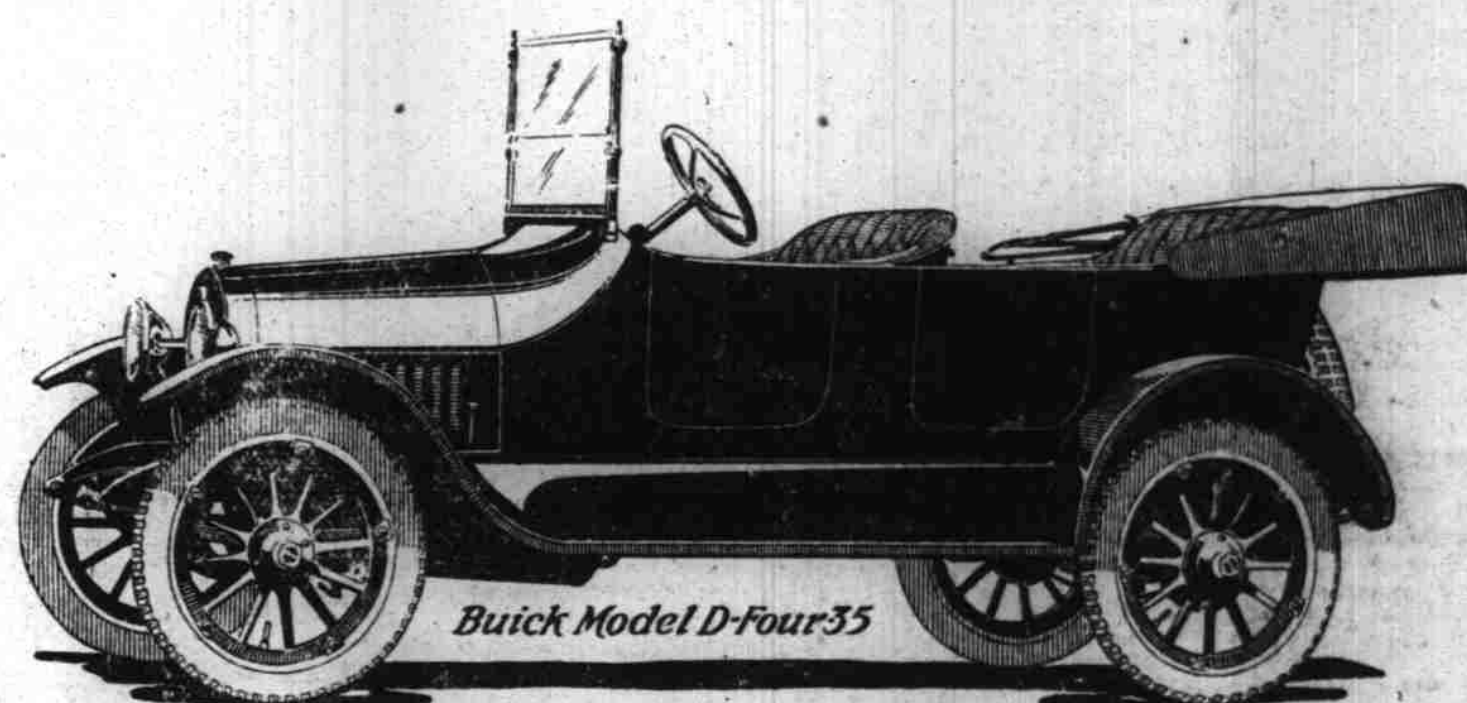
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Buick Model D-Four-35

The biggest thing about this Four is the Buick Valve-in-Head Motor.

THE newest Buick product, Model D-Four-35, designed to meet the requirements of those motorists who desire a car with the power and sturdiness which can only be found in the Buick. It is equipped with the famous Buick Valve-in-Head motor, which gives assurance to prospective owners that this car will travel anywhere the wheels can find a foothold.

Particular pains were taken by Buick engineers to make this model of the Buick a sturdy, useful motor car. This model of the Buick was designed primarily for use, and for plenty of it. In its make-up there is incorporated the same high proportion of drop forged steel for which all Buicks are famous, and which makes Buick durability possible.

The materials used in this model measure up to Buick standards throughout. Nothing has been skimmed or slighted. The workmanship is as fine as can be found in the motor car industry.

In principles of design and construction, in standards of manufacture, and in actual performance, this model of the Buick measures up to all Buick traditions.

Motorists take pride these days in the appearance of their cars. Next to a car that performs well, the average owner wants a car that looks well. The new Buick "Four," as will be observed in the photographic likeness above, is of a pure streamline design. The outside of the car is clean of all projections which would interfere with the streamline effect. Door handles and hinges are hidden. Side lights are omitted, the small lights for city driving being enclosed in the headlights. The horn is under the hood, where it can be heard without being seen. Thus the outside of the car is kept clean and smooth throughout, giving a pleasing impression to the eye.

Taken either as a whole or viewed in detail, the new Four measures up to the Buick standard in appearance. It is the latest and best example of the motor car designer's art.

Roadster, D-4-34, \$650.00
Touring Car, D-4-35, \$665.00
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